CLAIMS

1. A high velocity pressure burner system for burning air and gas thereby creating a flue gas, the system comprising:

a blower for pressurizing the air;

a control for adjusting the pressure of the pressurized air;

a combustion chamber having a flue gas outlet;

a burner disposed on the combustion chamber comprising:

an air orifice for receiving the pressurized air;

a gas orifice for receiving the gas;

the air orifice causing the pressured air to flow over the gas orifice to form an air/gas mixture;

at least one spinner vane disposed upstream of the gas orifice creating turbulence in the air/gas mixture;

a retender disposed downstream of the gas orifice creating turbulence in the air/gas mixture; and

the flue gas outlet sized to create a back pressure on the burning air/gas mixture.

2. The system of claim 2 further including a gas proportionator making the gas a slave of the air.

3. The system of claim 1 wherein the combustion chamber has a refractory lined block with a reduced size flue gas exhaust port which creates positive pressure on the fire.

4. The system of claim 1 further including maximum speed of air across the spinner vanes and out of venturi mixer and retender into combustion area achieving maximum turbulence and flame propagation.

5. The system of claim 1 wherein the retender completes finite mixing of hydrocarbon atoms and oxygen atoms in air.

6. The system of claim 1 wherein the retender breaks up one directional high velocity, usually 400 FPS to 500 FPS at high fire and aids in turbulent flow of mix.

7. The system of claim 1 wherein the retender acts as flame stabilizer.

8. The system of claim 1 wherein the retender is made of high nickel content material, such as RA 310 or Inconel, or other material with a prolonged service life at 2,000 degrees F. operating temperature.

9. The system of claim 1 wherein the retender flattens mix and flame more thereby allowing mix to slow down in the larger diameter circle which facilitates improved combustion.

10. The system of claim 1 that prioritizes turbulence over time and temperature and the turbulence dictates the time and temperature.

11. The system of claim 1 wherein the flue gas outlet laces a back pressure on the downstream side of the flame.

12. The system of claim 1 that more than doubles the heat flux per square foot of receiver via forced convection.

13. The system of claim 1 that maintains the same ratio of gas to air at any firing rate and percentage of excess air on either high fire or low fire or any point in between.

14. The system of claim 2 wherein proportionator results in a linear control of gas to air by controlling the pressure across orifices without the coordination of valves.

15. The system of claim 1 that maintains a linear control of air/gas mix regardless of firing rate.

16. A high velocity pressure burner system for burning air and gas thereby creating a flue gas to heat a boiler, the system comprising:

a blower for pressurizing the air;

a control for adjusting the pressure of the pressurized air;

a combustion chamber having a flue gas outlet;

a burner disposed on the combustion chamber comprising:

an air orifice for receiving the pressurized air;

a gas orifice for receiving the gas;

the air orifice causing the pressured air to flow over the gas orifice to form an air/gas mixture;

at least one spinner vane disposed upstream of the gas orifice creating turbulence in the air/gas mixture;

a retender disposed downstream of the gas orifice creating turbulence in the air/gas mixture;

a boiler having an exhaust stack and a plurality of tubes for flowing a fluis therethrough; and

the flue gas outlet sized to create a back pressure on the burning air/gas mixture and communicating with the boiler to pass the hot flue gases across the tubes of the boiler and out the exhaust stack.

17. The system of claim 16 wherein there is a boiler pressure drop of 2" – 8" water column with increased turbulence giving control of flame to insure equalization of every pound of flue gas to make uniform heat flux to every square foot of tube surface.

18. The system of claim 16 wherein the burnewr is operated at a temperature that eliminates CO from the exhaust and adds to BTU's obtained from every pound of fuel burned as well as improved Ti temp which increases heat flux from the gas to the receiver, both radiant and forced convection.

19. The system of claim 16 that maintains the same emissions in PPM NOX and CO, high to low fire.

20. The system of claim 16 that maintains a complete burn at several times the BTU per hour per square foot or cubic foot of combustion area compared to all other burners.

21. The system of claim 16 that saves BTU's from exhaust gas by reduction in pounds of heated air being exhausted to atmosphere.

22. The system of claim 16 that reduces the exhaust flue gas temperature.

23. The system of claim 16 that gives increased heat flux from the flue gas to boiler.

24. The system of claim 16 that will reduce NOX emissions at all firing rates, without any additions such as flue gas recirculation, steam injection or staged fuel or air.

25. A method of combusting gaseous hydrocarbon fuel in the air that gives ultra low NOX emissions in sub10 PPM NOX and 0 (zero) PPM CO.